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Application No.: 10/073,411

IN THE CLAIMS

1. (Currently amended) A method ~~Method~~ for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls joining said peripheral walls, and two circumferential wings, for anchoring a tyre, which extend outwards from the two sides of the outer peripheral wall,

wherein ~~it~~ said method comprises the following steps:

a. applying on ~~the~~ an inner part of a mould a predetermined number of layers of structural fibre fabric incorporated in a plastic material matrix ~~which are~~ sufficient to form ~~the~~ an inner wall, ~~the~~ an outer wall, ~~the~~ two lateral walls and ~~the~~ wings;

b. arranging an inflatable bag on the layers between the lateral walls;

c. folding a first selected ~~predetermined~~ number of the predetermined layers on the inflatable bag, leaving the remaining predetermined number of layers free;

d. applying ~~at least one~~ a core over the folded ~~first predetermined number of~~ layers;

e. folding ~~a second~~ the remaining predetermined number of the layers over the core;

f. applying an ~~the~~ outer part of the mould ~~so as~~ to enclose the layers;

g. inflating the inflatable bag ~~so as~~ to press the layers against the mould;

h. increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix; and

i. ~~removing the bicycle wheel rim from the mould and~~ removing the core from the product of step h, ~~so as~~ to obtain a bicycle wheel rim formed of a single piece of structural fibre material.

2. (Original) Method according to claim 1, wherein also said core applies pressure to said layers.

3. (Original) Method according to claim 1, wherein the increase of temperature and application of pressure to the layers occur substantially simultaneously.

4. (Original) Method according to claim 1, wherein a cooling phase is provided before removal of the rim from the mould.

5. (Original) Method according to claim 1, wherein said core is made of a material with a thermal dilation coefficient exceeding 5xlO mm/°C, the moulding process comprising an increase in temperature to a value sufficient to cause the material of said core to dilate so to press the layers of fabric forming the tyre anchoring wings against the wall of the mould.

6. (Original) Method according to claim 5, wherein the material forming the core has a thermal dilation coefficient exceeding 9x10 mm/0C.

7. (Original) Method according to claim 6, wherein the material forming the core is either PTFE, or PCTFE, or PVDF, or PE-HD.

8. (Original) Method according to claim 6, wherein the material forming the core is PTFE.

9. (Original) Method according to claim 1, wherein said structural fibres are carbon fibres.

10. (Original) Method according to claim 1, wherein said plastic material is a thermosetting plastic material matrix.

11. (Original) Method according to claim 1, wherein said temperature is comprised in the range from 80°C to 200°C.

12. (Original) Method according to claim 11, wherein said temperature is maintained for a time comprised in the range from 10 minutes to 3 hours.

13. (Original) Method according to claim 12, wherein said temperature is maintained for a time comprised in the range from 30 minutes to 3 hours.

14. (Original) Method according to claim 1, wherein the core comprises two ring-shaped cores, which are arranged so as to be spaced from each other.

15. (Original) Method according to claim 14, wherein each ring-shaped core is made in a single piece of deformable material.

16. (Original) Method according to claim 14, wherein each ring-shaped core is split into several sectors.

17. (Original) Method according to claim 14, wherein the space between said ring-shaped cores is filled by a circumferential rib belonging to the mould.

18. (Original) Method according to claim 14, wherein a third ring-shaped core, also made of thermally dilating material, is arranged between said two rings.

19. (Original) Method according to claim 18, wherein said third ring-shaped core is made in a single piece of deformable material.

20. (Original) Method according to claim 18, wherein said third ring-shaped core is split into several sectors.

21. (Original) Method according to claim 1, wherein the core is made by a single ring-shaped member of deformable dilating material.

22. (Original) Method according to claim 21, wherein the core is made of a silicone sheath.

23. (Original) Method according to claim 22, wherein the silicone sheath is divided in sectors.

24. (Original) Method according to claim 23, wherein the single ring-shaped core has an outwardly facing recess for engagement of a centering projection of the mould.

25. (Original) Method according to claim 24, wherein the centering projection is provided on an outer portion of the mould.

26. (Original) Method according to claim 1, wherein the mould comprises two inner circumferential elements arranged side by side, on which the layers for forming the inner peripheral wall and the two lateral walls of the rim are deposited, said mould also comprising an outer circumferential element for pressing said layers (12b) which are to form the tyre anchoring wings over said one or more cores.

27. (Original) Method according to claim 1, wherein said structural fibres are selected among: carbon fibres, glass fibres, aramidic fibres, boron fibres, ceramic fibres, or any combinations thereof.

28. (Original) Method according to claim 1, wherein said tyre anchoring wings are firstly made during said moulding process with a longer length than required and that after opening the mould said wings are reduced to the required length and/or shape by a machining operation.

29. (Original) Method according to claim 1, wherein first additional layers (C) are applied to increase the thickness of the outer wall and/or of the two wings of the rim.

30. (Original) Method according to claim 29, wherein second additional layers (D) are applied to fill the side regions of the outer wall of the rim from which said wings depart.

31. (Original) Method according to claim 1, wherein said mould and said cores are arranged to define a rim with a symmetrical cross-section.

32. (Original) Method according to claim 1, wherein said mould and said cores are arranged to define a rim with an asymmetrical cross-section.

33. (Original) Method for producing a bicycle wheel rim of the type presenting a peripheral inner wall, an outer peripheral wall, two lateral walls joining said peripheral walls and two circumferential wings for anchoring a tyre which radially extend outwards from the two sides of the outer peripheral wall, wherein said rim is made as a single part of structural fibre material, by means of a moulding process of several layers of structural fibre fabric incorporated in a plastic material matrix, and wherein said tyre anchoring circumferential rims made in said moulding process are longer than required and wherein after the moulding process said circumferential wings are subjected to a machining operation to reduce them to the required length and/or shape.

34.-44. (Cancelled)

45. (Original) Method for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls joining said peripheral walls, and two circumferential wings for anchoring a tyre which radially extend outwards from the two sides of the outer peripheral wall,

wherein the peripheral inner wall, the peripheral outer wall and the two lateral walls are made by applying a number of layers of structural fibre fabric incorporated in a plastic material matrix, in that said layers are arranged in a mould and an inflatable bag is arranged inside the cavity defined between the layers which are to form said walls, so as to press said layers against the mould wall during the moulding process, and in that also said circumferential tyre anchoring wings are moulded in the mould by applying a number of layers (12b) of said structural fibre material incorporated in a plastic material matrix, and in that said layers for making the tyre anchoring wings are applied over one or more cores arranged inside the mould, in the space comprised between the layers (12, 12b) which are for forming the outer peripheral wall and the layers for forming the two tyre anchoring wings.

46. (Currently amended) Method for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls

joining said peripheral walls, and two circumferential wings, for anchoring a tyre, which extend outwards from the two sides of the outer peripheral wall,

wherein ~~it~~ said method comprises the following steps:

a. applying on ~~the~~ an inner part of a mould a predetermined number of layers of structural fibre fabric incorporated in a plastic material matrix ~~which are~~ sufficient to form ~~the~~ an inner wall, ~~the~~ an outer wall, ~~the~~ two lateral walls and ~~the~~ wings;

b. arranging an inflatable bag on the layers between the lateral walls;

c. folding a first selected ~~predetermined~~ number of the predetermined layers on the inflatable bag, leaving the remaining predermined number of layers free;

d. applying ~~at least one~~ a core over the folded ~~first predetermined number of~~ layers;

e. folding ~~a second~~ the remaining predetermined number of the layers over the core;

f. applying ~~the~~ an outer part of the mould ~~so as~~ to enclose the layers;

g. ~~inflating the inflatable bag so as to press~~ pressing the layers against the mould with the inflatable bag and the core;

h. increasing the temperature of the mould to a value sufficient to cause

reticulation of the plastic material matrix; and

i. ~~removing the bicycle wheel rim from the mould and~~ removing the core from the product of step i, ~~so as~~ to obtain a bicycle wheel rim formed of a single piece of structural fibre material~~, and~~

~~wherein also said core applies pressure to said layers~~.

47. (Currently amended) Method for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls joining said peripheral walls, and two circumferential wings, for anchoring a tyre, which extend outwards from the two sides of the outer peripheral wall,

wherein ~~it~~ said method comprises the following steps:

a. providing a mould having an inner part and an outer part;

b. applying on the inner part of a mould a predetermined number of layers of structural fibre fabric incorporated in a plastic material matrix ~~which are~~ sufficient to form ~~the~~ an inner wall, ~~the~~ an outer wall, ~~the~~ two lateral walls and ~~the~~ wings;

c. arranging an inflatable bag on the layers between the lateral walls;

d. folding a first selected ~~predetermined~~ number of the predetermined layers on the inflatable bag, leaving the remaining predetermined number of layers free;

e. applying ~~at least one~~ a single ring- shaped core of deformable dilating

material over the folded ~~first predetermined number of~~ layers;

f. folding ~~a second~~ the remaining predetermined number of the layers over the core;

g. applying the outer part of the mould ~~so as~~ to enclose the layers;

h. inflating the inflatable bag ~~so as~~ to press the layers against the mould;

i. increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix;

j. ~~removing the bicycle wheel rim from the mould and~~ removing the core from the product of step i, ~~so as~~ to obtain a bicycle wheel rim formed of a single piece of structural fibre material~~, and~~

~~wherein the core is made by a single ring shaped member of deformable dilating material~~.

48. (Currently amended) Method for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls joining said peripheral walls, and two circumferential wings, for anchoring a tyre, which extend outwards from the two sides of the outer peripheral wall,

wherein ~~it~~ said method comprises the following steps:

a. providing a mould having an inner part and an outer part with a centering projection on the outer part;

b. applying on the inner part of ~~a~~ the mould a predetermined number of layers of structural fibre fabric incorporated in a plastic material matrix ~~which are~~ sufficient to form ~~the~~ an inner wall, ~~the~~ an outer wall, ~~the~~ two lateral walls and ~~the~~ wings;

c. arranging an inflatable bag on the layers between the lateral walls;

d. folding a first selected ~~predetermined~~ number of the predetermined layers on the inflatable bag, leaving the remaining predetermined number of layers free;

e. applying ~~at least one~~ a core of a deformable dilating material with an outwardly facing recess for engagement of the centering projection of the outer portion of the mould over the folded first predetermined number of layers;

f. folding ~~a second~~ the remaining predetermined number of the layers over the core;

g. applying ~~the~~ an outer part of the mould ~~so as~~ to enclose the layers;

h. inflating the inflatable bag ~~so as~~ to press the layers against the mould;

i. increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix;

i. ~~removing the bicycle wheel rim from the mould and~~ removing the core from the product of step i, ~~so as~~ to obtain a bicycle wheel rim formed of a single piece of structural fibre material~~, wherein the core is made by a single ring-shaped member of deformable dilating material,~~

~~wherein the single ring-shaped core has an outwardly facing recess for engagement of a centering projection of the mould, and~~

~~wherein the centering projection is provided on an outer portion of the mould~~.

49. (Currently amended) Method for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls joining said peripheral walls, and two circumferential wings, for anchoring a tyre, which extend outwards from the two sides of the outer peripheral wall,

wherein ~~it~~ said method comprises the following steps:

a. providing a mould having an inner part and an outer part;

b. applying on the inner part of ~~a~~ the mould a predetermined number of layers of structural fibre fabric incorporated in a plastic material matrix ~~which are~~ sufficient to form ~~the~~ an inner wall, ~~the~~ an outer wall, ~~the~~ two lateral walls and ~~the~~ wings;

c. arranging an inflatable bag on the layers between the lateral walls;

d. folding a first selected ~~predetermined~~ number of the predetermined layers on the inflatable bag, leaving the remaining predetermined number of layers free;

e. applying ~~at least one~~ a core over the folded ~~first predetermined number of~~ layers;

f. folding ~~a second~~ the remaining predetermined number of the layers over the core;

g. applying the outer part of the mould ~~so as~~ to enclose the layers;

h. inflating the inflatable bag ~~so as~~ to press the layers against the mould;

i. increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix;

j. ~~removing the bicycle wheel rim from the mould and~~ removing the core from the product of step i, ~~so as~~ to obtain a bicycle wheel rim formed of a single piece of structural fibre material, and

wherein said structural fibres are ~~selected among~~: carbon fibres, glass fibres, aramidic fibres, boron fibres, ceramic fibres, or any combinations thereof.

50. (Currently amended) Method for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls joining said peripheral walls, and two circumferential wings, for anchoring a tyre, which extend outwards from the two sides of the outer peripheral wall,

wherein ~~it~~ said method comprises the following steps:

a. providing a mould having an inner part and an outer part;

b. applying on the inner part of a mould a predetermined number of layers of structural fibre fabric incorporated in a plastic material matrix ~~which are~~ sufficient to form ~~the~~ an inner wall, ~~the~~ an outer wall, ~~the~~ two lateral walls and ~~the~~ wings;

c. arranging an inflatable bag on the layers between the lateral walls;

d. folding a first selected ~~predetermined~~ number of the predetermined layers on the inflatable bag, leaving the remaining predetermined number of layers free;

e. applying ~~at least one~~ a core over the ~~folded first predetermined number of~~ layers;

f. folding ~~a second~~ the remaining predetermined number of the layers over the core;

g. applying the outer part of the mould so as to enclose the layers;

h. inflating the inflatable bag ~~so as~~ to press the layers against the mould;

i. increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix;

j. ~~removing the bicycle wheel rim from the mould and~~ removing the core from the product of step i, ~~so as~~ to obtain a bicycle wheel rim formed of a single piece of structural fibre material, and

wherein said tyre anchoring wings are firstly made during said moulding process with a longer length than required and that after opening the mould said wings are reduced to the required length and/or shape by a machining operation.

51.-53. (Cancelled)

54. (New) The method of claim 48 wherein the core is comprised of a single ring-shaped member.

55. (New) The method of claim 48 wherein the core is comprised of a multi-part, ring-shaped member.

56. (New) A bicycle wheel rim produced by the process of:

a. applying on an inner part of a mould a predetermined number of layers of structural fibre fabric incorporated in a plastic material matrix sufficient to form an inner wall, an outer wall, two lateral walls and wings;

b. arranging an inflatable bag on the layers between the lateral walls;

c. folding a first selected number of the predetermined layers on the inflatable bag, leaving the remaining predetermined number of layers free;

d. applying a core over the folded layers;

e. folding the remaining predetermined number of the layers over the core;

f. applying an outer part of the mould to enclose the layers;

g. inflating the inflatable bag to press the layers against the mould;

h. increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix; and

i. removing the core from the product of step h, to obtain a bicycle wheel rim formed of a single piece of structural fibre material.

57. (New) The rim of claim 56 wherein the process further comprises the core being a single ring-shaped member.

58. (New) The rim of claim 56 wherein the process further comprises the core being a multi-part, ring-shaped member.

59. (New) A method for producing a bicycle wheel rim of the type presenting an inner peripheral wall, an outer peripheral wall, two lateral walls joining said peripheral walls, and two circumferential wings, for anchoring a tyre, which extend outwards from the two sides of the outer peripheral wall,

wherein said method comprises the following steps:

a. applying on an inner part of a mould a predetermined number of layers of structural fibre fabric incorporated in a thermally activated material sufficient to form an inner wall, an outer wall, two lateral walls and wings;

b. arranging an inflatable bag on the layers between the lateral walls;

c. folding a first selected number of the predetermined layers on the inflatable bag, leaving the remaining predetermined number of layers free;

d. applying a core over the folded layers;

e. folding the remaining predetermined number of the layers over the core;

f. applying an outer part of the mould to enclose the layers;

g. inflating the inflatable bag to press the layers against the mould;

h. increasing the temperature of the mould to a value sufficient to activate the thermally activated material; and

i. removing the core from the product of step h, to obtain a bicycle wheel rim formed of a single piece of structural fibre material.

60. (New) Method according to claim 59, wherein said core also applies pressure to said layers.

61. (New) Method according to claim 59, wherein the increase of temperature and application of pressure to the layers occur substantially simultaneously.

62. (New) Method according to claim 59, wherein a cooling phase is provided before removal of the rim from the mould.

63. (New) Method according to claim 59, wherein said core is made of a material with a thermal dilation coefficient exceeding 5xlO mm/°C, the moulding process comprising an increase in temperature to a value sufficient to cause the

material of said core to dilate so to press the layers of fabric forming the tyre anchoring wings against the wall of the mould.

64. (New) Method according to claim 63, wherein the material forming the core has a thermal dilation coefficient exceeding 9x10 mm/0C.

65. (New) Method according to claim 64, wherein the material forming the core is either PTFE, or PCTFE, or PVDF, or PE-HD.

66. (New) Method according to claim 64, wherein the material forming the core is PTFE.

67. (New) Method according to claim 59, wherein said structural fibres are carbon fibres.

68. (New) Method according to claim 59, wherein said thermally activated material is a thermosetting plastic material matrix.

69. (New) Method according to claim 59, wherein said temperature is comprised in the range from 80°C to 200°C.

70. (New) Method according to claim 69, wherein said temperature is maintained for 10 minutes to 3 hours.

71. (New) Method according to claim 70, wherein said temperature is maintained for 30 minutes to 3 hours.

72. (New) Method according to claim 59, wherein the core comprises two ring-shaped cores, which are arranged so as to be spaced from each other.

73. (New) Method according to claim 72, wherein each ring-shaped core is made in a single piece of deformable material.

74. (New) Method according to claim 72, wherein each ring-shaped core is split into several sectors.

75. (New) Method according to claim 72, wherein the space between said ring-shaped cores is filled by a circumferential rib belonging to the mould.

76. (New) Method according to claim 72, wherein a third ring-shaped core, also made of thermally dilating material, is arranged between said two rings.

77. (New) Method according to claim 76, wherein said third ring-shaped core is made in a single piece of deformable material.

78. (New) Method according to claim 76, wherein said third ring-shaped core is split into several sectors.

79. (New) Method according to claim 59, wherein the core is made by a single ring-shaped member of deformable dilating material.

80. (New) Method according to claim 79, wherein the core is made of a silicone sheath.

81. (New) Method according to claim 80, wherein the silicone sheath is divided in sectors.

82. (New) Method according to claim 81, wherein the single ring-shaped core has an outwardly facing recess for engagement of a centering projection of the mould.

83. (New) Method according to claim 82, wherein the centering projection is provided on an outer portion of the mould.

84. (New) Method according to claim 59 wherein the mould comprises two inner circumferential elements arranged side by side, on which the layers for forming the inner peripheral wall and the two lateral walls of the rim are deposited, said mould also comprising an outer circumferential element for pressing said layers which are to form the tyre anchoring wings over said one or more cores.

85. (New) Method according to claim 59, wherein said structural fibres are selected among: carbon fibres, glass fibres, aramidic fibres, boron fibres, ceramic fibres, or any combinations thereof.

86. (New) Method according to claim 59, wherein said tyre anchoring wings are firstly made during said moulding process with a longer length than required and that after opening the mould said wings are reduced to the required length and/or shape by a machining operation.

87. (New) Method according to claim 59, wherein first additional layers (C) are applied to increase the thickness of the outer wall and/or of the two wings of the rim.

88. (New) Method according to claim 87, wherein second additional layers (D) are applied to fill the side regions of the outer wall of the rim from which said wings depart.

89. (New) Method according to claim 59, wherein said mould and said cores are arranged to define a rim with a symmetrical cross-section.

90. (New) Method according to claim 59, wherein said mould and said cores are arranged to define a rim with an asymmetrical cross-section.